

## Claims:

1. A method of detecting Parkinson's disease (PD) through MRI of substantial nigra pars compacta (SNc) tissue comprising:
  - obtaining a gray matter suppressed (GMS) MRI signal of said SNc tissue;
  - obtaining a white matter suppressed (WMS) MRI signals of said SNc tissue;
  - combining information from said GMS and WMS MRI signals to produce a resultant signals indicative of PD.
2. A method as in claim 1 in which said obtaining of each of the GMS and WMS MRI signals comprises using an inversion recovery (IR) pulse sequence.
3. A method as in claim 2 including forming GMS and WMS MRI images using information from said GMS and WMS MRI signals, respectively, and wherein said combining step comprises combining at least portions of said GMS and WMS images.
4. A method as in claim 3 in which said combining comprises obtaining a ratio image of GMS and WMS images for at least one MRI slice.
5. A method as in claim 4 further comprising processing selected medial and lateral regions of interest in each ratio image to derive a numerical measure indicate of the presence and/or staging of PD.
6. A method as in claim 1 further including using the resultant signals to stage PD.
7. A method as in claim 1 including plotting the resultant signals in a two-dimensional plot in which markers for patients with PD appear in an area different from that for patient without PD

- 4 8. A method as in claim 7 in which the markers for patient with PD appear in  
5 different areas corresponding to different stages of PD.
- 1 9. A method as in claim 1 in which said resultant signals are indicative of a relative  
2 loss of MRI signal from lateral as compared with medial portions of the SNc.
- 1 10. A method of detecting Progressive Supranuclear Palsy (PSP) through MRI of  
2 substantial nigra pars compacts (SNc) tissue comprising:  
3 obtaining a gray matter suppressed (GMS) MRI signal of said SNc tissue;  
4 obtaining a white matter suppressed (WMS) MRI signals of said SNc tissue;  
5 combining information from said GMS and WMS MRI signals to produce a  
6 resultant signals indicative of PSP.
- 1 11. A method as in claim 10 in which said resultant signals are indicative of a relative  
2 loss of MRI signal from medial as compared with lateral portions of the SNc.
- 1 12. A method of distinguishing between two forms of parkinsonism radiographically,  
2 Parkinson's disease (PD) and Progressive Supranuclear Palsy (PSP) through  
3 MRI of substantial nigra pars compacts (SNc) tissue comprising:  
4 obtaining at least two starting MRI images of SNc tissue using different MRI  
5 parameters;  
6 combining the starting images to compute resultant signals differentiating  
7 between PD and PSP.
- 1 13. A method as in claim 12 in which the at least two starting images comprise a  
2 gray matter suppressed (GMS) MRI image and a white matter suppressed  
3 (WMS) MRI image of said SNc tissue in the same MRI slice.

- 1 14. A method as in claim 13 in which each of said GMS and WMS image is obtained  
2 using an inversion-recovery MRI pulse sequence.
- 1 15. A method of detecting at least one of Parkinson's disease (PD) and Progressive  
2 Supranuclear Palsy (PSP) through MRI of substantial nigra pars compacta (SNc)  
3 tissue comprising:  
4 obtaining at least two starting MRI images of SNc tissue using different MRI  
5 parameters;  
6 combining the starting images to compute resultant signals indicative of and  
7 identifying at least one of PD and PSP.
16. A method as in claim 12 in which the at least two starting images comprise a  
gray matter suppressed (GMS) MRI image and a white matter suppressed  
(WMS) MRI image of said SNc tissue in the same MRI slice.
17. A method as in claim 13 in which each of said GMS and WMS image is obtained  
using an inversion-recovery MRI pulse sequence.